

AMENDMENTS TO THE ABSTRACT OF THE DISCLOSURE:

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The present invention relates to a system of applying optical gradient forces to form a plurality of optical traps to manipulate small particles. The system includes a light source for generating a focused beam of light which is directed along an optical axis through a phase patterning optical element having a variable optical surface and which has a virtual lens encoded thereon. The optical element produces a plurality of beamlets that are converged at a position between the optical element and a single transfer lens, and directed through the transfer lens to overlap at the back aperture of a focusing lens. The focusing lens converges the beamlets to form a plurality of optical traps in the working focal region where particles to be examined, manipulated, or measured, are disposed.